



**Collection, Storage,  
Preservation and  
Scientific Study of Fossils  
from Federal and Indian Lands**





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## Introduction

Senate Report 105-227 on the Fiscal Year 1999 Interior and Related Agencies Appropriations Act states that the “*Secretary of the Interior, in consultation with appropriate scientific, educational and commercial entities, should develop a report assessing the need for a unified Federal policy on the collection, storage, and preservation of ... fossils.*” Agencies to be consulted in preparation of the report to Congress are to include, but not be limited to, the Bureau of Land Management, the Forest Service, the National Park Service, the Fish and Wildlife Service, the Bureau of Reclamation, the Bureau of Indian Affairs and the Smithsonian Institution. While not a regulatory or land managing agency, the U.S. Geological Survey has been among the Interior Department agencies consulting on the report to Congress (“Consulting Agencies”) because of its special expertise in the earth sciences. Senate Report 105-227 also encourages the Secretary of the Interior to assess the need for standards that would “...*maximize the availability of fossils for scientific study...*” and “...*evaluate the effectiveness of current methods for storing and preserving fossils collected on public lands....*”

A key step in developing the report to Congress will be a public meeting with groups and individuals who have an interest in these topics. The Consulting Agencies have prepared this paper to give background for those who may attend about how the agencies currently manage fossils under the laws, regulations, and policies under which they work.

### The Value of Fossils

What is a fossil? In the broadest definition a fossil is any indication of ancient life preserved in the earth's crust. (Human remains, and the things made by human beings, are considered anthropological or historical materials and are not discussed in this background paper.) Thus a fossil can be a bone or shell or leaf, but also a filled-in burrow, or even organic material such as oil and coal that no longer preserves the form of the original organism in any detail. Fossils are the only evidence we have of the more than the 3.5 billion years that life has existed on earth. They show that the first organisms on the planet were similar to living blue-green algae, that there was a great diversification of multicellular animals in the oceans about 540 million years ago, that four-legged creatures first walked on land about 350 million years ago, that dinosaurs evolved about 220 million years ago, and that mammals came to the fore about 65 million years ago. Fossils also show how the physical earth has changed over time: that climate has warmed and cooled, that the positions of continents have changed, and that mountains have been lifted up from ocean bottoms. Fossils also document the response of life to changing conditions, revealing mass extinctions of species at several times in the history of the planet, and other periods when many new forms appeared in a short time. Fossils also help us understand the genealogical relationships of living species to one another.

The information about the history of life and the earth that can be obtained from fossils is irreplaceable. This information is also increasingly valuable to our society. Humans are now changing the earth's environments at a faster rate than ever before in

recorded history, but there are examples of rapid environmental change in the geological past. Studying the fossil record is one of the few ways we can investigate the effects of such change without waiting for it to happen. Fossils can be used to test climate models by comparing their “predictions” of the past against the distribution of climatically sensitive fossils. Fossils also indicate the effect of past environmental changes on biological diversity and ecological structure. Thus the fossil record is a testing ground for our ideas about how the world works.

Fossils also have a unique role to play in education. This is because paleontology, the study of fossils, is a science that combines geology, biology, chemistry and physics, in an effort to understand the origin of our world and ourselves. Most of us are fascinated by the history of our surroundings, and fossils, especially dinosaurs, stimulate curiosity and imagination. Fossils are a means for teaching both adults and children how science works. The educational value of fossils is clearly revealed by the strong amateur interest in fossil collecting. Many people enjoy searching for fossils because of what they reveal about the world, or simply for the challenge of finding something rare, old and beautiful.

Some fossils also have commercial value. Like objects of art or gemstones, these fossils are rare, or beautiful, or awe-inspiring. Even before there was a science of paleontology, people have collected fossils in order to sell them to museums or private collectors. Some commercially valuable fossils also are valuable scientifically because, for example, they preserve information that is rarely found in fossils, or come from localities that were previously unknown, or are under current scientific study. Fossils of vertebrates (animals with backbones) frequently have both high scientific and commercial value.

## **Policy Goals**

The principal existing federal goals for fossils from federal lands are to safeguard the intellectual and educational values described above and to promote public benefit from them. Inexpert collecting, or the failure to maintain precise information on the original location, rock type, or other conditions of a fossil occurrence, can damage fossils, or cause them to lose their context and therefore much of their value as objects of study. This is the primary reason why collecting fossils on federal lands is regulated by federal agencies. Proper storage and care of fossils once they have been collected is also a key objective. This is why fossils from federal lands are placed in museums where they are safe, where their physical condition and information about them can be maintained, and where they are available for scientific study and public display.

All fossils are relatively rare, but some types are much rarer than others. Many kinds of shell and leaf fossils are extremely abundant locally; literally millions of fossils may be present in a small area. Museums and universities usually have collections from such sites, and the sites themselves may be well documented. In contrast, vertebrate fossils (bones) are rare, and articulated vertebrate skeletons are particularly rare and difficult to collect. The goals of management are not met when rare and scientifically valuable fossils are lost to study through destruction, loss of information, or sale to private collectors. However, even amateur collectors may participate in research on vertebrate fossils by working with professional paleontologists and donating specimens to museums.

Current federal policy for fossils on federal lands is in general premised on the paramount values of science and education. However, lands administered by different agencies are managed for different purposes, and this affects the management of fossils. These are reviewed below.

## Federal Land Fossil Management

### Collecting Requirements

**General:** The agencies identified in this report manage fossil collecting on the lands they administer under their individual legislative mandates (preservation or multiple use). The DOI has long recognized the absolute rarity and scientific importance of vertebrate fossils.

Hobbyists, educators, and others interested in fossils are allowed to collect some kinds of specimens for noncommercial use. The policies for collecting fossils on lands administered by the individual agencies may vary because of their different roles and missions in managing federal lands. Table 1 below outlines the practices of the DOI.

**Table 1: Practices of the DOI for collecting fossils**

	<b>Invertebrates</b>	<b>Vertebrates</b>	<b>Petrified Wood</b>	<b>Other Fossil Plants</b>
<b>BLM</b>	Reasonable amounts for personal use, no permit required	Must have a permit	Up to 25 lbs/day/person +1 piece; not to exceed 250 lbs/year for personal use only	Reasonable amounts for personal use, no permit required
<b>BOR</b>	Must have a permit	Must have a permit	Must have a permit	Must have a permit
<b>FWS</b>	Special Use permit required; scientific or educational purposes only	Special Use permit required; scientific or educational purposes only	Special Use permit required; scientific or educational purposes only	Special Use permit required; scientific or educational purposes only
<b>NPS</b>	Permit required; scientific purposes only	Permit required; scientific purposes only	Permit required; scientific purposes only	Permit required; scientific purposes only

**Scientific:** The sections above outline the ways in which federal agencies work to implement their policies for managing fossils on or from the federal lands. The USGS and SI serve primarily to collect, study, and preserve specimens and data in the public trust, but are not land managing agencies. The land managing agencies also work to make fossils available for scientific study. Depending on their individual legislative mandate, some of the agencies provide opportunities for the public to collect many types of fossils, and through their hobby, educate themselves and others.

**Table 2: Requirements for Obtaining a Scientific Collecting Permit**

	<b>Qualifications</b>	<b>Permit Types</b>	<b>Other</b>	<b>Repository</b>
<b>BLM</b>	Graduate degree in paleontology or related topics; or equivalent experience with one who meets that standard	Survey/limited surface collection (<1 sq m disturbance; or excavation (1 sq m surface disturbance or more	Reports required annually and at the end of project. Work in Special Mgmt Areas requires additional reviews	Designated by permit applicant; must meet DOI/BLM standards
<b>BOR</b>	Similar to BLM, based on type of work			
<b>FS</b>	Same as BLM	Varies with forest unit, from survey and inventory to excavation and collection	Reports required annually and at the end of project. Work in Wilderness Areas may be restricted	Designated in application for Special Use Permit; must meet FS standards. Standards added to permit
<b>FWS</b>	Related to nature of work			Similar to BLM
<b>NPS</b>	In revision; qualifications and experience to conduct scientific study or represents reputable scientific or educational institutions or state/federal agencies		Reports required annually	At NPS units, or in an approved repository designated by permit applicant; must meet DOI/NPS standards

**Other:** Permittees may be subject to requirements arising from various applicable laws such as those concerning threatened and endangered species, cultural sites, and wildlife habitats. Permittees may be required to avoid some areas or to limit their work at certain times of the year. Every agency must comply with a variety of laws, including the National Environmental Policy Act, the Endangered Species Act, the Wilderness Act, the Federal Cave Resources Protection Act, the National Historic Preservation Act, and the Archeological Resources Protection Act (see Appendix 1).

## Storage and Preservation

Land managing agencies work through the permitting process to ensure that fossils from federal lands are available for display, study, and enjoyment. Permittees must meet high standards for education and experience so that their work will contribute to preservation efforts, and will not damage or destroy fragile specimens. The fossils they collect under permits issued by the various agencies remain the property of the federal government, and as such are the property of all Americans. Every permit must specify an appropriate repository, or specimens must be repositied by the agency itself, in order to keep the specimens in physically safe environments where professional staff can carry out the tasks of cleaning, conserving, storing, retrieving, and loaning them. Institutions may be evaluated periodically to ensure that they are capable of meeting their obligations for the care of specimens.

Departmental Manual 411 is an example of how the Department of the Interior sets and maintains standards for the care of collections. Other documents, such as NPS Museum Handbooks, add specific directions for individual agencies.

The NPS has identified more than 120 parks that preserve fossils that, together, provide a comprehensive history of life on earth. The National Park Service manages fossils for their scientific and educational values. Management actions may be taken to prevent damage from natural processes such as erosion. Protection may include construction of shelters over specimens for interpretation, *in situ*, stabilization in the field, or collection, preparation, and placement of specimens in museum collections. The localities and geologic settings of specimens must be adequately documented when specimens are collected.

The US Geological Survey and Smithsonian Institution have special roles in collecting, storing, and preserving fossils and the information about them, which are summarized in Appendix 3.

## Field Inventory, Monitoring and Protection

**Inventory and Monitoring:** Due to the vast expanse and scattered nature of the approximately 450 million acres of public lands administered by the BLM and the Forest Service, these agencies conduct inventory and monitoring on a case-by-case basis. When notice of a proposed land use is received, the agency determines whether the affected lands contain or have the potential to contain vertebrate fossils or noteworthy occurrences of invertebrate or plant fossils. Depending on that analysis, a determination is made whether a field survey is necessary to locate these resources. If necessary, fossils may be collected, documented, and sent to a repository before or during a project.

The NPS Natural Resources Management Guideline (NPS-77) establishes standards for the management of paleontological resources within national parks. The acquisition of baseline paleontological resource data, the establishment of cyclic monitoring programs, and the establishment of research standards serve as the framework for managing, protecting and interpreting fossils in units of the National Park System.

The foundation of NPS paleontological resource management is an understanding of their scope, significance, and geographic/stratigraphic distribution. Most parks need more baseline data about fossils. The *Yellowstone Paleontological Survey*, begun in 1996 and finished in 1998, includes maps, references, and a list of fossils known from the park, along with a series of recommendations for management. It provides a prototype for documenting baseline NPS paleontological resource data. In 1998, additional inventories were begun at Big Bend, Death Valley, Grand Teton, and Zion National Parks, and Timpanogos Cave National Monument.

Once baseline data are established for a park, a protocol for long-term monitoring can be developed. Factors that may be considered in a monitoring protocol include geographic/ stratigraphic distribution of the fossils, rates of erosion, and proximity of the fossils to visitor-use areas. Data collected are maintained for each locality monitored, along with photo documentation. For further information about monitoring, see Collaborative Management (below).

**Protection:** The loss of parts of the fossil record means the loss of important scientific and educational information about the history of the earth. Both natural events, such as erosion, and human-caused events contribute to this loss. Land managing agencies, in addition to gathering baseline and monitoring data, investigate and prosecute incidents of

resource theft and vandalism. The NPS developed the first Paleontological Resource Protection Training for its staff in 1985, and with other agencies, has continued this effort.

In Petrified Forest National Park, casual collecting and souvenir hunting have removed significant quantities of petrified wood from the surface of heavily visited areas. Diligent efforts to monitor the losses, along with public education, have resulted in much reduced rates of removal. Park staff establish public awareness and instill values through education, interpretation, and providing strong resource protection messages.

In order to maximize the scientific and educational value of fossils on federal lands, managers must also take into account natural processes of erosion. Fossils are damaged and eventually destroyed by erosion, although how quickly varies dramatically according to rock type, climate, topography, and the composition of the fossils, among other factors. Permittees, volunteers, and trained amateurs play an important role in these situations by helping to collect fossils and information for preservation in repositories. Training programs that educate the public and involve amateur paleontologists in efforts to mitigate the loss of significant fossils to erosion have proven to be very successful. However, no comprehensive study of how much erosion contributes to the loss of the fossil record, how rates of loss may vary, and how best to deal with this loss, has been done.

## **Information Management**

Land managing agencies use the information that permittees provide through reports and publications. Managers in multiple use agencies such as the BLM and FS need reliable information about all the resources in areas where, for example, road building or other surface disturbance is planned.

Information about fossils from federal lands is available to the general public through museum displays and interpretive materials, and in materials developed by federal agencies, including websites (see Appendix 4). More detailed information is available to researchers. Computer technology makes it possible to learn more about specimens already in federal repositories or museum collections, and for land managing agencies to develop Geographic Information Systems (GIS). GIS products being developed by the BLM and NPS enable land managers to see electronic maps that help determine where fossils should or should not occur, reducing the time and work that staff paleontologists would otherwise spend in research or field checking, and simplifying the task of prioritizing work in critical areas.

Results of scientific research conducted within NPS areas are available through the NPS website, either as Investigator's Annual Reports (IAR) or as NPS Paleontological Research volumes. The NPS is also systematically compiling bibliographic information through the inventory and monitoring program.

## **Collaborative Management**

The agencies identified in this effort share a number of common goals in managing fossils as resources. All share a goal of seeing that these resources are managed and protected in such a manner that preserves and promotes their scientific and educational values.

Some agencies have begun inter-agency initiatives to coordinate practices and make the management of paleontological resources more efficient and consistent by maximizing the use of scarce agency skills and resources. In central Oregon, for example, the BLM and the NPS have developed an Interagency Agreement for the co-management of paleontological resources around John Day Fossil Beds National Monument. Under this agreement, the NPS retrieves scientifically significant fossils and supplies expertise in curation, interpretation and records management, while the BLM provides supplies, materials and staff.

In addition, the BLM, NPS and FS have taken a number of steps internally to maximize the use of scarce in-house expertise. These agencies have established Servicewide, Regional or Zone Paleontologists, and share professional paleontology staffs as needs require. The FS in Region 2 has conducted several joint training classes with Badlands NP, and also with researchers who have scientific collecting permits.

Forest Service has several Challenge Cost Share agreements and Memoranda of Understanding in Regions 1, 2 and 4 with such organizations as the South Dakota School of Mines, the North Dakota Geological Survey and the Denver Museum of Natural History for inventory purposes, research and assistance with collection, curation and repositing of fossil specimens from National Forest System lands.

In 1986, the NPS organized its "Conferences on Fossil Resources in the National Parks." Now the conferences include the BLM and the FS, as well as representatives from other federal and state agencies, and from the professional and amateur communities. The professional and amateur paleontological societies have become valued partners in managing fossils. An outstanding example is the work of the Denver Museum of Natural History, the Garden Park Paleontological Society, and the BLM, whose partnership has returned dinosaur fossils to Colorado museums, acquired and protected historic fossil quarries, and involved communities in the pride of discovery and learning.

## **Indian Policies**

### **Indian Sacred Sites**

All federal agencies with jurisdiction over federal lands must also be in compliance with the President's Executive Order on Sacred Sites (E.O. 13007, May 24, 1996). The Executive Order states that each executive branch agency with statutory or administrative responsibility for the management of federal lands shall, to the extent practicable, permitted by law, and not clearly inconsistent with essential agency functions, (1) accommodate access to and ceremonial uses of Indian sacred sites by Indian religious

practitioners and (2) avoid adversely affecting the physical integrity of such sacred sites. Collection of fossils on public lands may impact Indian sacred sites and collectors must comply with this Executive Order and any agency policies or procedures developed pursuant to the Executive Order. *See* Departmental Manual, Part 512, Chapter 3: Departmental Responsibilities for Protecting/Accommodating Access to Indian Sacred Sites.

## **Bureau of Indian Affairs**

The authority of the Bureau of Indian Affairs (BIA) to manage fossil resources on Indian lands is limited and not mandated by statute. Indian lands are not public lands and the BIA has different responsibilities than other land managing agencies within the Department such as the Bureau of Land Management or the National Park Service. Indian lands are lands that the United States holds in trust, or that are subject to a restriction against alienation imposed by the United States, for the benefit of an Indian tribe or an individual Indian. The Government does not exercise the same rights of ownership or control over these lands as it does over its own public lands.

The government's role in managing Indian lands is that of a trustee. As a trustee, the BIA approves realty transactions or business arrangements with non-tribal parties that are initiated by an Indian landowner, and this approval is not discretionary. It is based on a determination that the transaction is to the benefit of the Indian landowner. Fossils that have commercial value have been found to be trust resources and the BIA must manage the fossils as a trust resource. In managing trust resources, the BIA is limited to approving either leases of Indian lands, or contractual agreements between Indian landowners and third parties for the extraction of such fossils. The criterion for these approvals is that the arrangements be of economic benefit to the Indian landowner. The arrangements are also subject to evaluation under the National Environmental Policy Act (42 U.S.C. 4321-4347) and the National Historic Preservation Act (16 U.S.C. 470 et. seq.).

Since Indian lands are not public lands, the Indian tribe or individual Indian landowner may use fossil trust resources for their economic benefit. The BIA's role in these transactions is to ensure that the transaction benefits the Indian landowner. The BIA has no other authority to manage paleontological resources within its jurisdiction.

## **Access**

If individuals or scientists are interested in access to fossils on Indian lands, they must contact the tribe or individual landowner and request permission. The tribe or individual Indian landowner may deny access to their lands or may allow access with certain restrictions. It is up to the Indian landowner, not the BIA, to determine who has access to their lands and under what conditions that access will be permitted. Scientists are encouraged to work directly with the tribe or individual Indian to secure permission for research.

## APPENDIX 1

### Authorities Relating to Fossils on Federal Lands

This section provides a brief overview of the various laws, regulations, and policies that agencies use to manage fossils on lands they administer for the federal government.

#### **Bureau of Land Management (BLM)**

##### *Statutes:*

**Federal Cave Resources Protection Act of 1988** (P.L. 100-691) protects significant caves and cave resources including fossils.

**Crimes and Criminal Procedures** (18 U.S.C. 641) addresses the unauthorized collection of fossils as a type of Government property.

**Federal Land Policy and Management Act of 1976** (P.L. 94-579) states that the public lands shall be managed in a manner that protects the quality of scientific and other values; requires that they be inventoried on a continuing basis; and that the use, occupancy and development of these lands be regulated through easements, permits, leases, licenses, published rules or other instruments.

##### *Regulations:*

**43 CFR 3621 and 3622** authorizes limited collection of Petrified Wood.

**43 CFR 3610** authorizes the sale of petrified wood as a mineral material.

**43 CFR 8365** prevents willful disturbance, removal and destruction of scientific resources or natural objects while authorizing limited collection of common invertebrate fossils.

**43 CFR 3802 and 3809** provides for protection of fossils from operations authorized under the mining laws.

**43 CFR 8200** provides practices and procedures for the management of lands with outstanding natural history values that are of scientific interest.

**43 CFR 1610** provides for the establishment of Areas of Critical Environmental Concern to manage and protect significant natural resources.

**43 CFR 8364** authorizes closure or restriction of public lands to protect resources.

**43 CFR 37** protects fossils in significant caves.

*Other authorities:*

**Departmental Manual Part 411: Policies and Standards for Managing Museum Collections** establishes policies and standards for the preservation, protection and documentation of museum collections.

**Departmental Manual Part 512:** Chapter 3: Departmental Responsibilities for Protecting/Accommodating Access to Indian Sacred Sites.

**BLM Manual Section 8270**, Paleontological Resource Management, sets forth uniform policy and direction for the Bureau's Paleontological Resource Management Program.

**BLM Handbook H-8270-1**, General Procedural Guidance for Paleontological Resource Management, provides bureau managers and staff with detailed standards and procedures for implementing Manual Section 8270.

#### **Smithsonian Institution (SI)**

*Statute:*

**The Organic Act of March 3, 1879** (20 U.S.C. 59, as amended) states that all collections of rock, minerals, soils, fossils and objects of natural history, archaeology and ethnology, made by the National Ocean Survey, the United States Geological Survey, or by other parties for the Government of the United States, when no longer needed for investigations in progress shall be deposited in the National Museum.

#### **United States Geological Survey (USGS)**

*Statute:*

**The Organic Act of March 3, 1879** (See Smithsonian Institution above)

#### **Fish and Wildlife Service (FWS)**

*Statutes:*

**Federal Cave Resources Protection Act of 1988** (P.L. 100-691) protects significant caves and cave resources including fossils.

**Crimes and Criminal Procedures** (18 U.S.C. 641) addresses the unauthorized collection of fossils as a type of Government property.

**National Wildlife Refuge System Administration Act of 1966** requires review of proposed activities (i.e. survey and collection of fossils) to determine whether

they are compatible with the mission and purposes of the affected national wildlife refuges, and requires preparation of 15-year comprehensive land-use planning program for all refuges. Such plans are used to identify and plan for the protection of paleontological resources.

**Alaska National Interest Lands Conservation Act of 1980** as amended (P.L. 96-487) requires the preservation of unrivaled scenic and geological values associated with natural landscapes and each refuge develop a comprehensive management plan to identify paleontological and other values.

*Regulations:*

**50 CFR 25 and 27** require the issuance of a special use permit for the collection of natural objects

*Other authorities:*

**Fish and Wildlife Service Museum Property Policy (126 FW 1-3)** establishes agency specific guidelines and standards for managing all FWS collections consistent with

**Departmental Manual 411** (See BLM above).

**Departmental Manual Part 512, Chapter 3** (See BLM above).

**Secretarial Order 3104** delegates authority to FWS to issue paleontological resource use permits for lands under its jurisdiction.

**Bureau of Reclamation (BOR)**

*Statutes:*

**Federal Cave Resources Protection Act of 1988** (P.L. 100-691) protects significant caves and cave resources including fossils.

**Crimes and Criminal Procedures** (18 U.S.C. 641) addresses the unauthorized collection of fossils as a type of Government property.

*Regulations:*

**43 CFR 3** provides for jurisdiction by appropriate Departments over ruins, archaeological sites, objects of antiquity and objects of historic and scientific interest.

*Other authorities:*

**Secretarial Order 3104** delegates authority to BOR to issue paleontological resource use permits for lands under its jurisdiction.

**Departmental Manual 411** (See BLM above)

**Departmental Manual Part 512, Chapter 3** (See BLM above).

**Forest Service (FS)**

*Statutory Authorities:*

**Organic Act of 1897** (16 U.S.C. 551). Requires the Secretary of Agriculture to make provisions for the protection of the National Forests; authorizes the Secretary to make such rules and regulations to preserve forests from destruction; and authorizes the Secretary to provide for criminal penalties for violations of such rules and regulations.

**Bankhead-Jones Farm Tenant Act of 1937, 7 U.S.C. § 1101.** Authorizes the Secretary to sell, exchange, lease, or otherwise dispose of, with or without consideration, property acquired under this Act, under terms and conditions the Secretary deems will best accomplish the purposes of the Act [including the preservation of natural resources], but any such sale, exchange, or grant shall be made only to public authorities and agencies and only on condition that the property is used for public purposes. Also authorizes the Secretary to make rules and regulations to conserve the property acquired by or transferred to the U.S. Department of Agriculture under this Act, the bulk of which is the National Grasslands.

**Criminal Procedures** (18 U.S.C. 641). Provides for criminal penalties for the unauthorized conversion of any thing of value of the United States.

**Hells Canyon National Recreation Area Act of 1975, 16 U.S.C. 460gg, et seq.** Requires the Secretary of Agriculture to insure the protection of paleontological resources in the Recreation Area, and to develop a management plan providing for controlled research use of such resources.

**Federal Cave Resources Protection Act of 1988** (P.L. 100-691, 16 U.S.C. 4301, et seq.) Protects significant caves and cave resources including paleontological deposits occurring naturally in such caves, and provides for permits for the collection and removal of cave resources under such conditions as the Secretary may impose.

**Archeological Resources Protection Act of 1979** (P.L. 96-95, 16 U.S.C. 470aa, et seq.) Authorizes the protection of fossilized or non-fossilized paleontological

specimens as archaeological materials when found in an archaeological context.

*Regulatory Authorities:*

**7 CFR 2.20(a)(2).** Delegates from the Secretary of Agriculture to the Under Secretary for Natural Resources and Environment the authority to: (I) provide national leadership in forestry, including the nonrenewable resources in forests and scientific and other values of forests and related lands; and (ii) protect, manage, and administer the National Forest System.

**7 C.F.R. 2.60(a).** Delegates the authority of the Under Secretary for Natural Resources and Environment outlined in 7 C.F.R. 2.20(a)(2), above, to the Chief of the Forest Service.

**36 CFR 261.9(b).** Prohibits removing any property of the United States.

**36 CFR 261.53.** Prohibits access to any area which is closed to protect objects of paleontological interest.

**36 CFR 290.** Provides for management and protection of significant caves and cave resources, including paleontological resources.

**36 CFR 292, subpart E.** Provides protection for paleontological resources in Hells Canyon National Recreation Area, and requires permits for controlled research use.

**36 CFR 228, subpart C.** provides for issuance of free use permits to amateur collectors and scientists for limited quantities of petrified wood, and allows for commercial collection of petrified wood under the provisions of the Materials Act of July 31, 1947 (30 U.S.C. 601).

**National Park Service (NPS)**

*Statutes:*

**NPS Organic Act of 1916** (16 U.S.C. 1) requires the Service to conserve the scenery and the natural and historic objects in the National Park System so as to leave them unimpaired for the enjoyment of future generations. It also gives the NPS broad authority to promulgate regulations necessary for the management and protection of parks, and their resources and values.

**Redwoods Act Amendment of 1978** (16 U.S.C. §1a-1) directs that the authorization of activities and the management of park units be exercised so as not to degrade the values and purposes for which the units were established, unless specifically provided for by Congress. The amendment constitutes applicable law

constraining the exercise of the Secretary's discretionary authority both in and adjacent to park unit boundaries.

**Federal Cave Resources Protection Act of 1988** (16 U.S.C. §4301 *et seq.*) protects significant caves and cave resources including fossils.

**Crimes and Criminal Procedures** (18 U.S.C. 641) addresses the unauthorized collection of fossils as a type of Government property.

**Alaska National Interest Lands Conservation Act of 1980** (16 U.S.C. §3101 *et seq.*) directs the NPS to develop, and periodically revise, a conservation and management plan for each of the park units authorized or expanded by the statute. The statute lists paleontological resources among those resources to be addressed in such plans. (*see* 16 U.S.C. §3191)

**National Parks Omnibus Management Act of 1998** (P.L. 105-391) authorizes the withholding of information concerning the nature and specific location of paleontological objects and other resources in parks from disclosure under the Freedom of Information Act.

**Archeological Resources Protection Act of 1979** ( See FS above)

*NPS Regulatory Authorities:*

**36 CFR 2.1** prohibits possessing, destroying, injuring, defacing, removing, digging, or disturbing from its natural state, non-fossilized and fossilized paleontological specimens, cultural or archeological resources, or the parts thereof.

**36 CFR 2.5** requires that the collection of research specimens is authorized only under the terms and conditions of a specimen collection permit.

**36 CFR 2.31** prohibits individuals from trespassing, tampering and vandalizing (destroying, injuring, defacing, or damaging) property or real property.

*NPS Administrative Authorities:*

**NPS Management Policies** is a service wide policy document that includes directives relative to paleontological resource management.

**NPS Natural Resources Management Guidelines (NPS-77)** is a comprehensive guideline for natural resources management including paleontology.

**NPS Museum Handbooks (Parts 1&2)** establishes agency specific guidelines and standards for managing museum collections consistent with **DM 411**.

**Departmental Manual 411** (See BLM above)

## APPENDIX 2

### Agency Definitions of “Fossil”

The definition of the terms “fossil” and “paleontological resource” differ among the various agencies, largely to conform with what each regulates and the mission of the agency. The USGS and the Smithsonian Institution, because they do not manage any lands, have the most inclusive definitions of these two terms.

USGS and the Smithsonian Institution define fossil to mean the remains, traces, or imprints of once-living organisms preserved in the earth’s crust.

BLM policy defines fossil to mean the remains or traces of an organism preserved by natural processes in the earth’s crust. The term does not include minerals such as coal, oil and gas, bitumen, lignite, asphaltum, gilsonite, or tar sands, which are controlled by the Mineral Leasing Act, even though they are of biologic origin. The BLM manages fossils as non-renewable paleontological resources, along with any associated scientific data.

FS defines paleontological resource (36 CFR 261.2) as any evidence of fossilized remains of multicellular invertebrate and vertebrate animals and multicellular plants, including imprints thereof. However, the rule notes that organic remains primarily collected for use as fuel, such as coal and oil, are excluded from the definition of paleontological resources as used in 36 CFR part 261, subpart a. In another regulation (36 CFR 292.41), FS defines paleontological resources to mean any remains, traces, or imprint of a plant or animal that has been preserved in the Earth’s crust prior to the Holocene epoch.

NPS defines fossil as any organic remains (plant or animal), trace, or imprint that has been preserved by natural processes within a geologic context. The NPS defines a paleontological resource as any fossil(s) and the associated geologic and paleontologic data. NPS manages fossils as non-renewable resources.

## APPENDIX 3

### Standards for Paleontological Collections at the Smithsonian Institute

The U.S. Geological Survey has had a long relationship with the Smithsonian Institution (SI) since its inception and follows the collection policies and procedures of the Smithsonian as briefly summarized below.

Policies and procedures regarding fossils under the care of the Smithsonian's Department of Paleobiology are detailed in the draft Collections Management Policy, last revised March 3, 1997, which is periodically updated to reflect current procedures or techniques. The primary goals of the collections management program with the SI are accessibility to and accountability for collections in order to maximize their long-term value for scientific research and education. The Collection Management Policy applies to all employees, tenants, volunteers, interns, and visitors of the Department of Paleobiology.

The SI accepts the responsibility of compiling, conserving, housing, and maintaining records and collections representative of fossil and some modern plants, animals, modern sediments, and rock samples. Specimens are stored in type, reference, stratigraphic, research, field, or teaching collections.

It is the SI's goal to develop reference collections representing all taxa as nearly completely as possible for taxonomic research, unrestrained by geographic or stratigraphic limitation. In addition, in its role as part of the National Museum, the SI aspires to be the central repository for all type specimens or other specimens referenced in the paleontological literature and originating from strata in the United States. This goal demonstrates the SI's commitment to the idea that fossils are part of our national heritage and comprise the tangible base for all existing taxonomic, biostratigraphic, paleoecologic, and biogeographic interpretations of the evolution of life on earth.

Policies and practices included in the Collections Management Policy include:

#### **- Acquisition-**

No specimens that have been stolen or unethically acquired should be made part of the collections. All specimens must be logged in by collections management within 5 working days of receipt. All specimens should be acquired without restriction and consistent with collections goals. The following criteria are considered in acquiring specimens: 1) does the donor/seller have full, clear title; 2) quality of preservation and rarity; 3) "isolation" in the scientific literature (e.g., named or photographed specimen); 4) quality of locality and stratigraphic documentation; 5) storage, maintenance and conservation needs; 6) cost or cost of transportation; 7) restrictions on donation;

8) recollectibility of similar specimens from the same site; 9) historical significance; 10) exhibit use; 11) if the acceptance would give or appear to give rise to commercial exploitation, and 12) duplication in existing collections.

#### **- Deaccession-**

A review process is required before material can be permanently removed from the collections. This process insures that proper accountability is maintained and that the deaccession is consistent with department goals. Criteria that are evaluated before deaccessioning include: 1) does the SI have full, clear title; 2) was the material accessioned in error; 3) specimen quality; 4) quality of locality and stratigraphic data; 5) is there a lack of resources for proper preservation; 6) is there other similar material in the collections; 7) could the storage space and resources required for the material be used to improve or strengthen other collections; and 8) commercial value. Acceptable methods of disposal of deaccessioned material are: 1) donation to or exchange with an educational institution, 2) transfer within the SI, 3) transfer to another government agency, 4) destruction or discarding, 5) return to donor if not purchased, and 6) repatriation. Under no circumstances may deaccessioned specimens be sold to anyone or personally acquired by staff, tenants, volunteers, interns or visitors of the Department.

#### **- Loans-**

Loans are made to institutions for the use of permanent staff, not to individuals. Loans are for the purpose of study, exhibition, identification at the SI's request, inspection pending exchange, destructive sampling, other purposes, e.g., specimen preparation by other entities at the request of the Department of Paleobiology. All specimens to be loaned must be invoiced and the invoice approved before the material leaves the Department. All invoices must carry a statement regarding the Department's policy governing the replication of loaned specimens. A drop tag must be left in the collection for any specimen removed at the time of removal. \*\* NB: some language has been lost at this point and will be restored by the SI. \*\* temporary custody for more than 90 days without a good faith effort to either return the material or determine the intention of the sender.

#### **- Access to Collections-**

Physical collections access is limited to specimens that are not part of the actively used research collections of staff, visitors, tenants, or on loan to the SI with restrictions that preclude use by non-departmental personnel. Use of the collections should be arranged in advance. Individuals may be barred from physical access to the collections if the SI believes they have a history of failing to follow good museum

practice. Access to collections information, such as provenance data and photographs, is limited to documentation that will not compromise the security of the collections and is not considered part of a staff member's ongoing research project.

**- Inventories–**

The SI has ongoing projects to document additions, record discrete sub-collections, and perform annual reconciliation of a sub-set of the collection with its automated database. Priorities for individual specimen or specimen lot inventory are: 1) type specimens, 2) commercially valuable specimens, 3) purchased collections, and 4) additions to previously inventoried collections. All new collections entering the Department whose specimens will not be integrated into existing collections must be added to the Collections Inventory File within one month of arrival, so that the locations and contents of the collections can be tracked.

## APPENDIX 4

### Web Pages and Electronic Databases

#### Web Pages:

BLM: Bureau of Land Management, Wyoming's Red Gulch Dinosaur Tracksite Web  
Page - <http://www.wy.blm.gov/whatwedo/tracsite/track.pages/intro2.html>

USFS: Forest Service web page - <http://www.fs.fed.us/geology>

USGS: The US Geological Survey's Web Page:

[http://ngmsvr.wr.usgs.gov/Paleo/paleo\\_home.html](http://ngmsvr.wr.usgs.gov/Paleo/paleo_home.html)

<http://geology.er.usgs.gov/paleo/>

NPS: The National Park Service Paleontology Web Page:

<http://www.nature.nps.gov/grd/geology/paleo/index.htm>

#### Databases Searchable on-line:

##### Smithsonian Institution:

The Bibliography of Hadrosaurian Dinosaurs, a literature-search bibliography compiled by Dr. Michael Brett-Surman, a Museum Specialist in the Department of Paleobiology

The Burgess Shale Pages, with reconstructions and text on fossils from the famous Canadian fossil beds discovered by Smithsonian Secretary Charles Wallcott in 1909.

The Fossil Brachiopod Type Register includes the Catalogue of USNM Recent brachiopods in alcohol, the Fossil and Recent Brachiopod Bibliography, and Fossil and Recent Brachiopod Lists of Genera.

The Fossil Shark Key, identify those fossil shark teeth you have been toting around! Created by Robert Purdy, a Museum Specialist in the Department of Paleobiology.

The National Foram Type Collection, a searchable database that has SEM images of some of the type foraminifera, as well as catalog and locality/collector information. This is a continuous project and more SEM images of type specimens will be available in the future.

The Plant and Algal Type Register, a nearly complete capture of the information about museum holdings of fossil plant and algae TYPE specimens.

<http://www.nmnh.si.edu/paleo/collections.html>



## Notes



## Notes



## Notes